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JAPANESE PATENT OFFICE

## PATENT ABSTRACTS OF JAPAN

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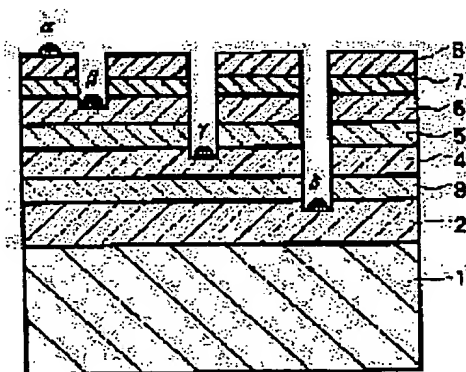
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(54) GALLIUM NITRIDE-BASED COMPOUND SEMICONDUCTOR LIGHT-EMITTING ELEMENT

(57)Abstract:

**PURPOSE:** To make one pixel on a multicolor-luminous LED display small and to obtain a picture whose colors have been mixed uniformly even from a nearby position by a method wherein at least two active layers whose band-gap energy is different are formed in a light-emitting element.

**CONSTITUTION:** A gallium nitride-based compound semiconductor which is expressed by  $\text{In}_x\text{Al}_y\text{Ga}_{1-x-y}\text{N}$  (where  $0 \leq x \leq 1$  and  $0 \leq y \leq 1$ ) is laminated on a substrate 1. In a gallium nitride-based compound semiconductor light-emitting element, two or more active layers 3, 5, 7 whose band-gap energy is different are formed in the light-emitting element. In the light-emitting element, the active layers 3, 5, 7 emit light when an electric current is applied to electrodes  $\alpha$ ,  $\beta$ ,  $\gamma$ ,  $\delta$  which have been formed in individual clad layers 2, 4, 6, 8. When a prescribed voltage is applied to the individual electrodes  $\alpha$ ,  $\beta$ ,  $\gamma$ ,  $\delta$ , the individual active layers 3, 5, 7 sandwiched by the clad layers 2, 4, 6, 8 emit light. As a result, colors can be mixed uniformly inside one chip.



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